

**U.S. DEPARTMENT OF ENERGY  
WEST VALLEY DEMONSTRATION PROJECT**

**Water Task Team Lays Groundwork for Record-Breaking Year at the  
West Valley Demonstration Project**

Over the last few years there have been a number of measures taken to further improve effluent water quality at the West Valley Demonstration Project. As shown in the attached chart, these efforts have resulted in a substantial reduction in the annual number of exceptions to the numerical discharge limits specified in the site State Pollutant Discharge Elimination System permit. This permit is issued by New York pursuant to the Federal NPDES program authorized under Section 402 of the Clean Water Act. With three-quarters of 1998 already completed, this is the best zero exceptions record for the past six years, and all indications suggest that this trend will continue.

Virtually all of the recorded exceptions were for indicator parameters or nutrients, such as nitrite, pH and 5-day biochemical oxygen demand, that regulate or are greatly influenced by natural (microbiological) treatment processes occurring at the site Industrial and Sanitary and Low-Level Waste Treatment facilities.

A Water Task Team was formed in February 1995 to tackle the problems causing these exceptions. The team consists of personnel from West Valley Nuclear Services Co., Inc., having expertise in the facets of wastewater engineering, treatment plant operation and process monitoring, and NPDES/SPDES permitting and compliance.

For those on the Team since its inception this record would be a major accomplishment considering the problems overcome. Here are some examples of conditions faced:

- \* Elevated concentrations of nitrogen-based nutrients, in particular nitrite, at the Low-Level Waste Treatment Facility:

Nitrite is normally an intermediate formed during the microbiological conversion of ammonia to nitrate. This conversion process was found to be inhibited by excess nitrate, pH below 6.0 S.U., and cold weather. This was remedied through better control of pH conditions in the open air lagoons, enhanced process monitoring to detect substantial changes in nutrient concentrations in the lagoon, and elimination of nitric acid from the filter cleaning/backflush procedure. The elimination of the acid backflush step became feasible with the replacement of the anthracite filter media with a sand filter media that can be effectively backflushed with softened water (rather than nitric acid solution). Since the replacement filter began operation, there has been an approximate 90 percent reduction in nitrate and no permit exceptions for nitrite.

- \* Excess algae in the Low-Level Waste Treatment Facility lagoons:

Seasonal algae growth caused elevated oxygen demand and fluctuating pH in low-level waste effluent lagoons. This was remedied through addition of hydrogen peroxide to the

water treatment process, consistent sparging (mixing) of the lagoons to increase dissolved oxygen, the use of filter socks to capture particulate entrained in the effluent water column, and modification of the SPDES permit with a revised method for determining compliance with biochemical oxygen demand limits that takes into consideration the sum total contribution of all the project regulated effluents rather than individual discharges.

- \* Elevated nitrite and oxygen demand at the Industrial and Sanitary Wastewater Treatment Facility:

This problem was found to be caused by sudden weather induced temperature changes in the system influent wastewater. An underground influent surge tank to moderate these temperature fluctuations was implemented in 1997 and since that time discharge monitoring results for these parameters have remained within permit numerical discharge limits.

- \* Changes in receiving stream conditions between sample collection events causing elevated Total Dissolved Solids in Franks Creek:

Augmentation water from the site reservoirs is used to control dissolved solids concentrations in Franks Creek during lagoon discharges. The delay associated with off-site shipment and analysis of permit-required, process control samples creates a window  $\cong$  time frame for stream conditions changes to occur without appropriate adjustment in augmentation flow to reliably demonstrate compliance. On-site analysis for this parameters was implemented which reduced the time delay and the associated risk for undetected changes in receiving stream conditions.

- \* Pumping and treating large amounts of groundwater from the North Plateau to prevent contaminated water from surfacing and exiting the site as surface flow.

Non-radiologically contaminated surface run-off, in the area of the Strontium-90 groundwater plume was captured and diverted away from or downstream from the plume Pump and Treat area.

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**WVDP SPDES Permit Limit Excursions  
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